Non-Line of Sight Launch System

Briefing to the
Indirect Fire Support Conference
October 27 - 28 2004
The Hatton
London

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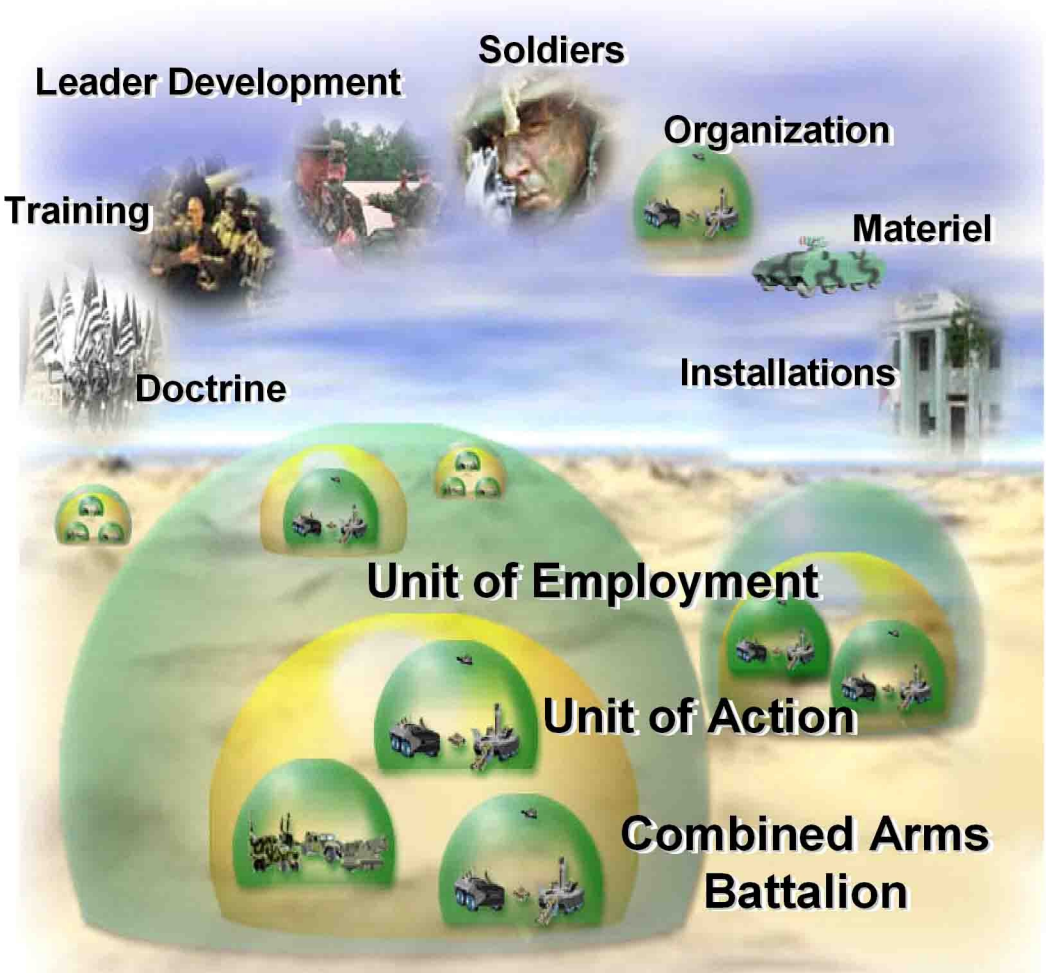
NLOS-LS in the U.S. Army Unit of Action

The US Army Future Force



- General Purpose Forces with Special Purpose Capabilities
- Advanced C4ISR and Information Superiority – *See First*
- Knowledge Based Operations – *Understand First*
- Combined Arms at Lowest Tactical Levels – *Act First and Finish Decisively*
- Deployability and Mobility – C-130 Transportable; Anywhere in the World a UA in 96 hours, a UE in 120 Hours, 5 UEs in 30 Days
- Echelonment – Units of Action and Units of Employment
- Sustainable – Self-Sustainable for 3-7 Days of Operation Without Replenishment from External Sources

Role of NLOS-LS in FCS

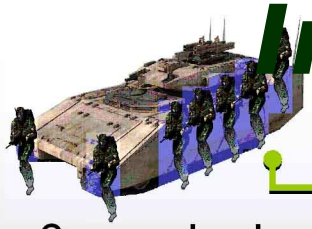
- To provide networked, extended-range targeting and precision attack of armored, lightly armored and other stationary and moving targets during day/night and near all weather conditions
- Provide responsive attack in concert with other FCS, external and joint capabilities
- Provide target discriminating capability via automatic target recognition and in support of battle damage assessment
- Be highly deployable and platform

NLOS-LS Is An Integral Part Of FCS And Vital To The Success Of The Unit Of Action

FCS Increment I

■ Manned Systems

Infantry Combat Vehicle



Command and Control Vehicle

Mounted Combat System

Recon and Surveillance

Non-Line of Sight Cannon

Non-Line of Sight Mortar

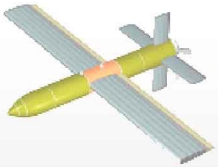
Replaced with HEMMT Wrecker

Medical Treatment and Evacuation

■ Unmanned Air Platforms

Class I

Class II



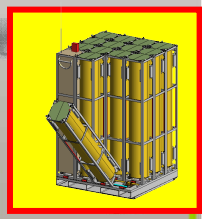
Class III

Class IV

■ UnattendedMunitions

• NLOS LS

• Intelligent



• Unmanned Payloads

• Unattended Ground Sensors

■ Unmanned Ground Vehicles

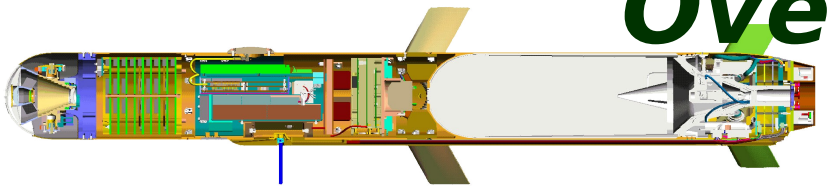
Armed Robotic Vehicle
ARV R
ARV A

Small Manpackable UGV

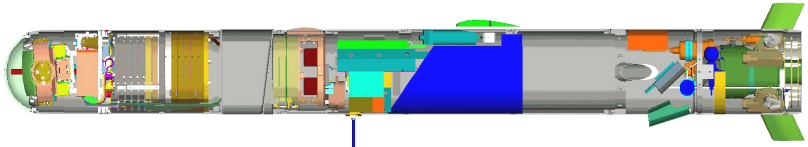
Mule
ARV-L

Approved for Public Release, Distribution Unlimited TACOM 24 March 2004

NLOS-LS Configuration Overview



Precision Attack Munition (PAM)



Loiter Attack Munition (LAM)

Container/Launch Unit

Missile Computer
Commo System

PM UA Networks / LSI Efforts

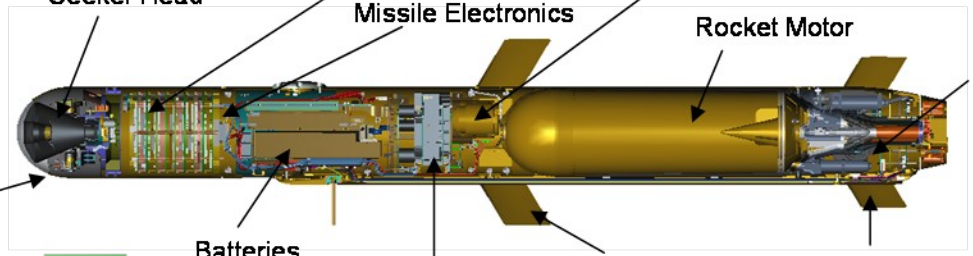
- Battle Command System
  - Network Development & Interface
  - Mission Manager Application
  - Receive / Proc seeker imager

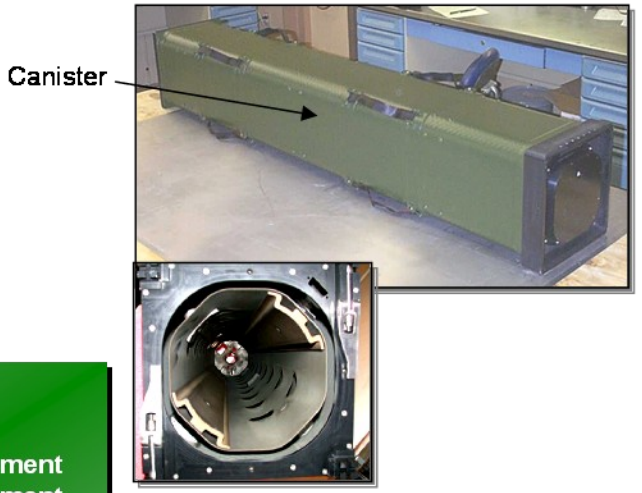
NLOS-LS Efforts

- Development of PAM, LAM, and CLU w/ MCCS
- Technical Fire Control
- Network Interfaces for CLU and Missiles
- Platform Interfaces with LSI and PM UA

Technology Demonstration Results

Demonstration vs. Tactical PAM

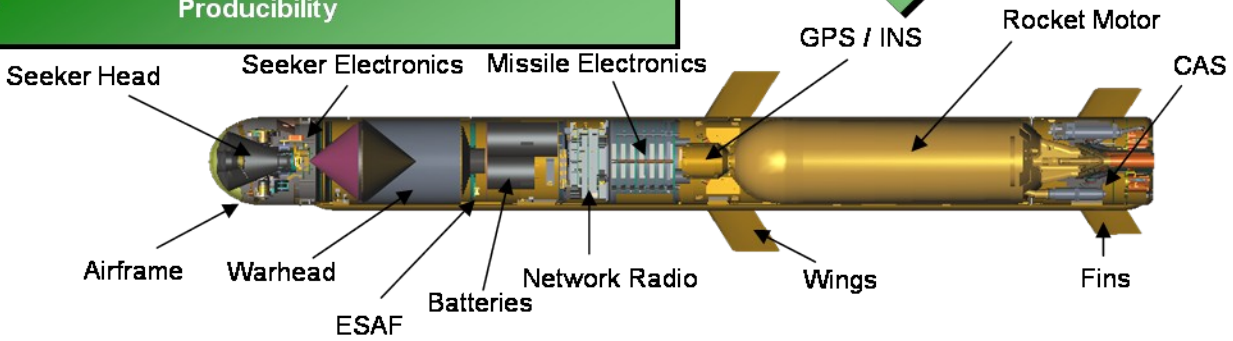




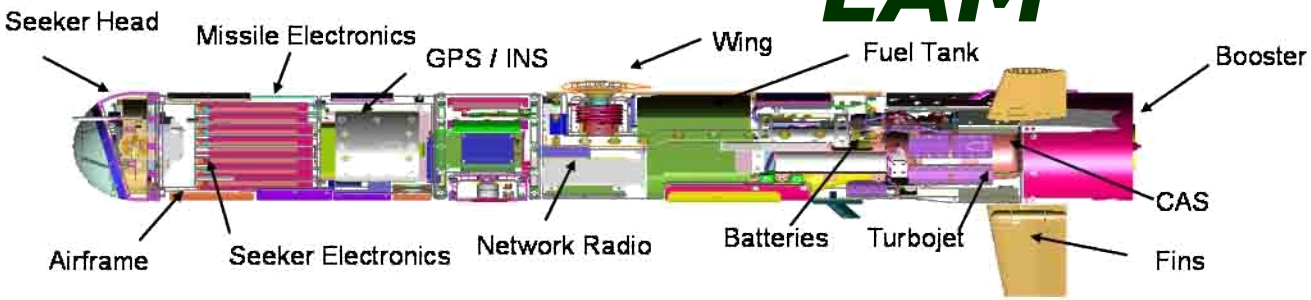
DEMO

System	Demo To Tactical
• Seeker Head	Producibility
• Seeker Electronics	Producibility / Design Enhancement
• Missile Electronics	Producibility / Design Enhancement
• Warhead	New
• ESAF	New
• GPS / INS	Producibility / Design Enhancement
• CAS	Design Enhancement
• Rocket Motor	Producibility / Design Enhancement
• Airframe	Producibility / Design Enhancement
• Wings	Producibility
• Fins	Producibility
• Batteries	New
• Network Radio	New
• Canister	Producibility

Tactical



Demonstration vs. Tactical LAM

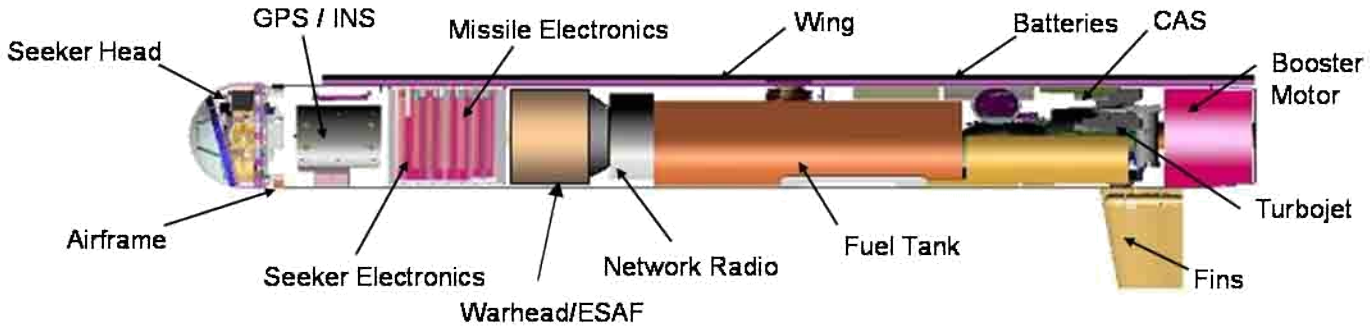


Canister

DEMO

System	Demo To Tactical
• Seeker Head	Producibility
• Seeker Electronics	Producibility / Design Enhancement
• Missile Electronics	Producibility / Design Enhancement
• Warhead	New
• ESAF	New
• GPS / INS	Design Enhancement
• CAS	Design Enhancement
• Booster	Producibility / Design Enhancement
• Turbojet	Producibility / Design Enhancement
• Fuel Tank	Design Enhancement
• Airframe	Producibility / Design Enhancement
• Wings	Design Enhancement
• Fins	Design Enhancement
• Batteries	Design Enhancement
• Network Radio	New
• Canister	Producibility / Design Enhancement

TACTICAL



Command Launch Unit (C/LU)

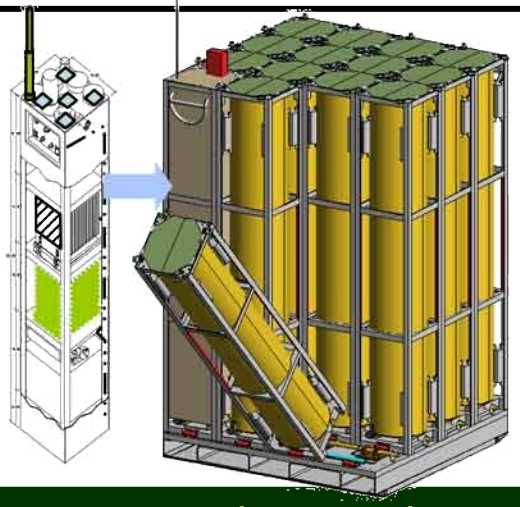
Raytheon Accomplishments

Lockheed Accomplishments

Collaborative Effort

Capabilities:

- **Network Radio/Node**
- **15 Missile**
- **C-130 HMMWV Roll-On/Roll-Off**
- **Platform Independent**
- **Self Aligning, Self Locating, Reloadable, Reconfigurable**
- **Determine vertical, North, and GPS location**



Army Will Combine the Best Functions and Capabilities From the DARPA Demo Developments Into the NLOS-LS Launcher

CTV-2

NetFires

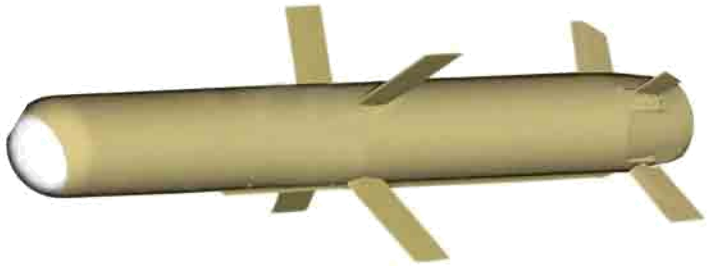
CTV-1

GTV2

Key Operational and Technical Requirements

Precision Attack Missile (PAM)

Technical Requirements



Requirement	ORD Threshold
Maximum Range	40 km
Minimum Range	500m
Target Set	High Value Targets (Armor)
Updates in Flight	Two-Way Comms w/ FCS Network

Data Link

- JTRS Compatible
- 2-Way – Op in loop
- Software Programmable

Multi-Mode Seeker

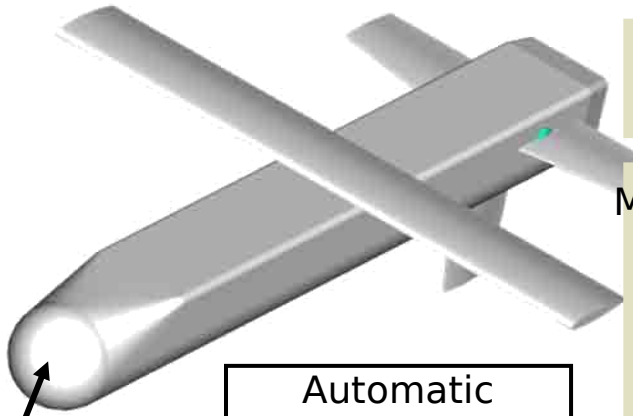
- Semi-Active Laser (SAL)
- Un-Cooled Imaging Infra Red (UCIIR)

GPS/INS Navigation System

Automatic Target Acquisition

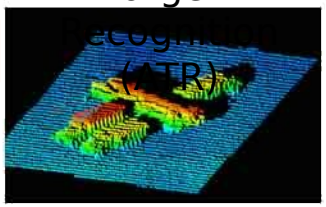
PAM Provides A 40km Precision Kill Capability Against Moving Armored Targets Using Laser Guidance or Automatic Target Acquisition

Loiter Attack Missile (LAM) Technical Requirements



LADAR Seeker

Automatic Target



Requirement	ORD Threshold
Maximum Range (INF Treaty)	< 480 km
Minimum Range	500m
Typical Range with Loiter (km)	70km w/ 30 min loiter
Target Set	High Value Targets (TEL/MRL)
Updates in Flight	Two-Way Comms w/ FCS Network

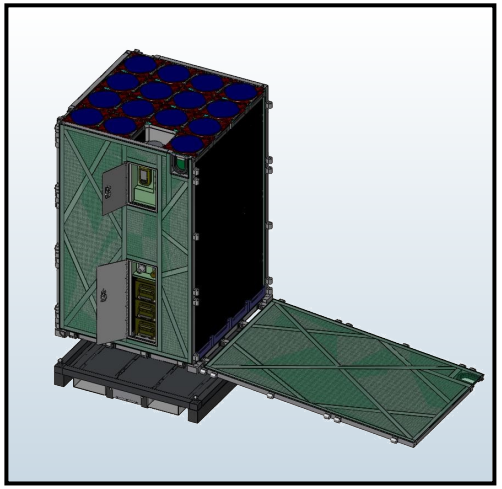
Data Link
- JTRS Compatible
- 2-Way – Op in loop
- Software Programmable

Jet Engine
- Low Cost Turbojet

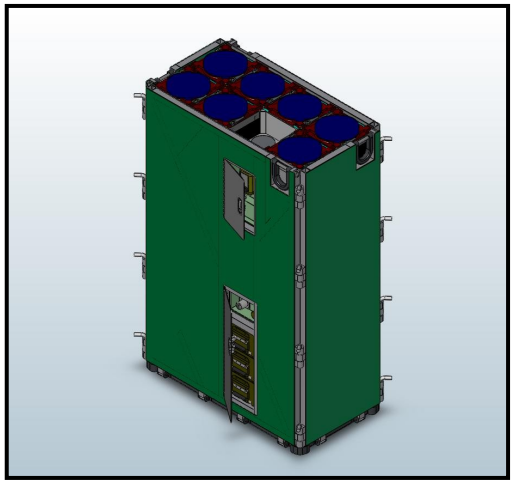
LAM Provides a Dedicated, Discriminating Point Kill Capability with Loitering Long Range Recon

Command Launch Unit (C/LU)

- Network Radio/Node
- 15 Missile in the 4X4 Configuration
- C-130 Roll-On/Roll-Off
- Platform Independent
- Self Aligning, Self Locating, Reloadable, Reconfigurable
- Determine vertical, North, and GPS location
- Can Operate Independent of any Network
- Can Operate Without any Auxiliary Equipment / Platform (On the Ground)
- Rotary Aircraft Transportable
- C130 Combat Ready Configurations
  - 3 HMMWVs = 45 Missiles (1 CLU/HMMWV)
  - 1 FMTV = 30 Missiles (2 CLUs / FMTV)
  - 1 PLS Flatrack = 120 Missiles (8 CLUs / Flatrack)



CLU 4x4 Configuration



CLU 2x4 Configuration

C130 NLOS-LS Platform Load-out Comparison

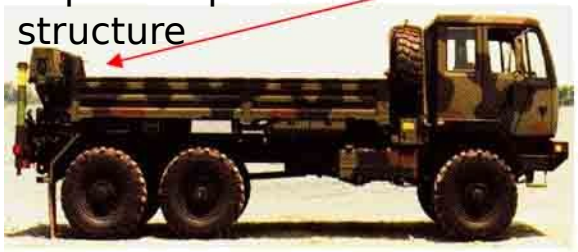
Platform Assumptions

- Maximize number of munitions per plane load and also system performance while minimizing system prep time
- Meet the intent of the NLOS-LS ORD requirements for transportability
- Have no or minimal impact to predicted force structure

Roll Off: Immediate Mission

Roll Off: 45 missiles available for immediate support

FMTV: M1085, 1086 with MHE



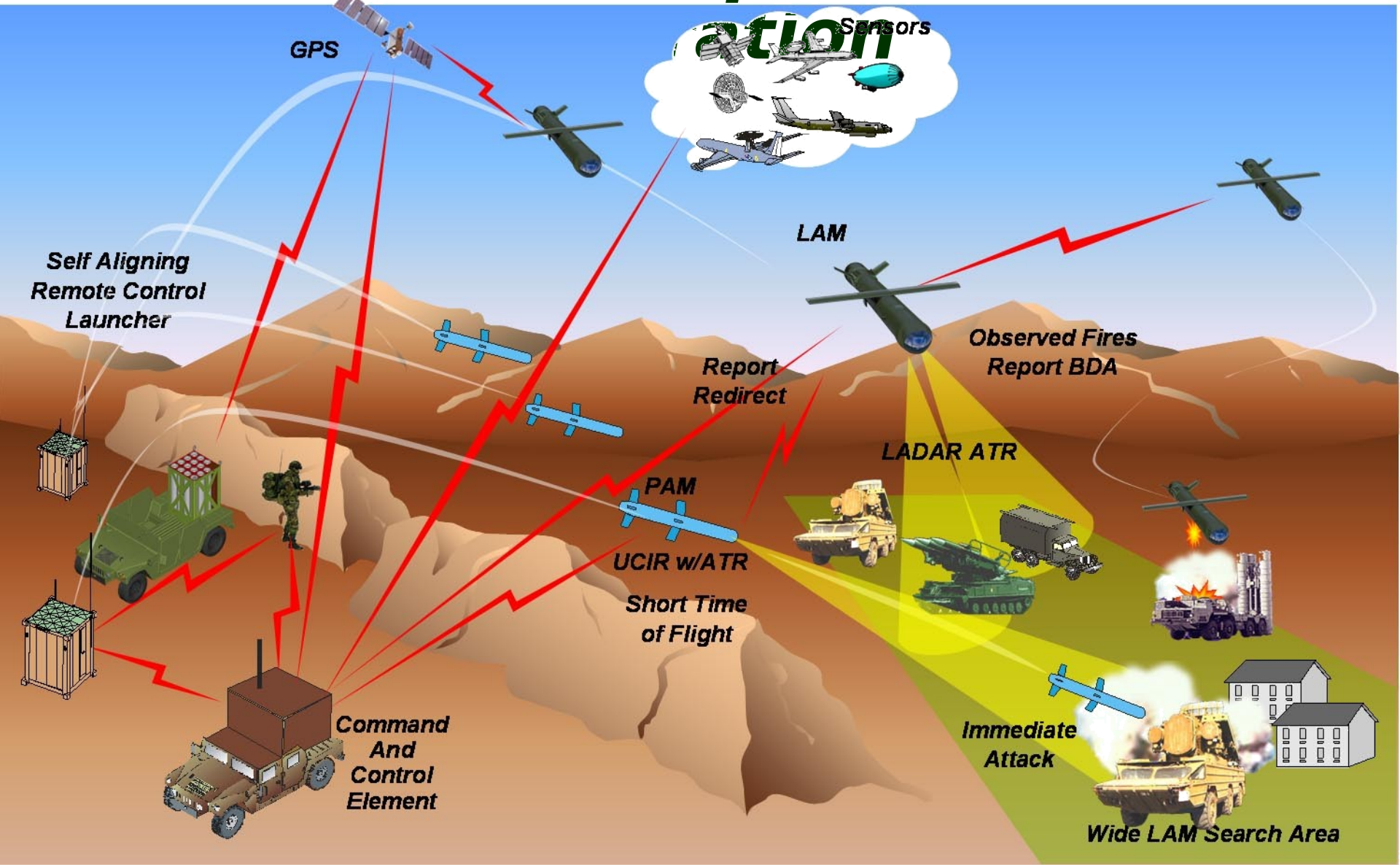
NLOS-LS contracting for Heavy HMMWV (MIII3), and FMTV Consideration being given to FTTS -MS/UV, HEMTT, PLS Flatrack, MULE, RST-V, and FMTV trailers. Overarching requirement is for NLOS-LS to be platform independent.

Key Technical Advantages of NLOS-LS

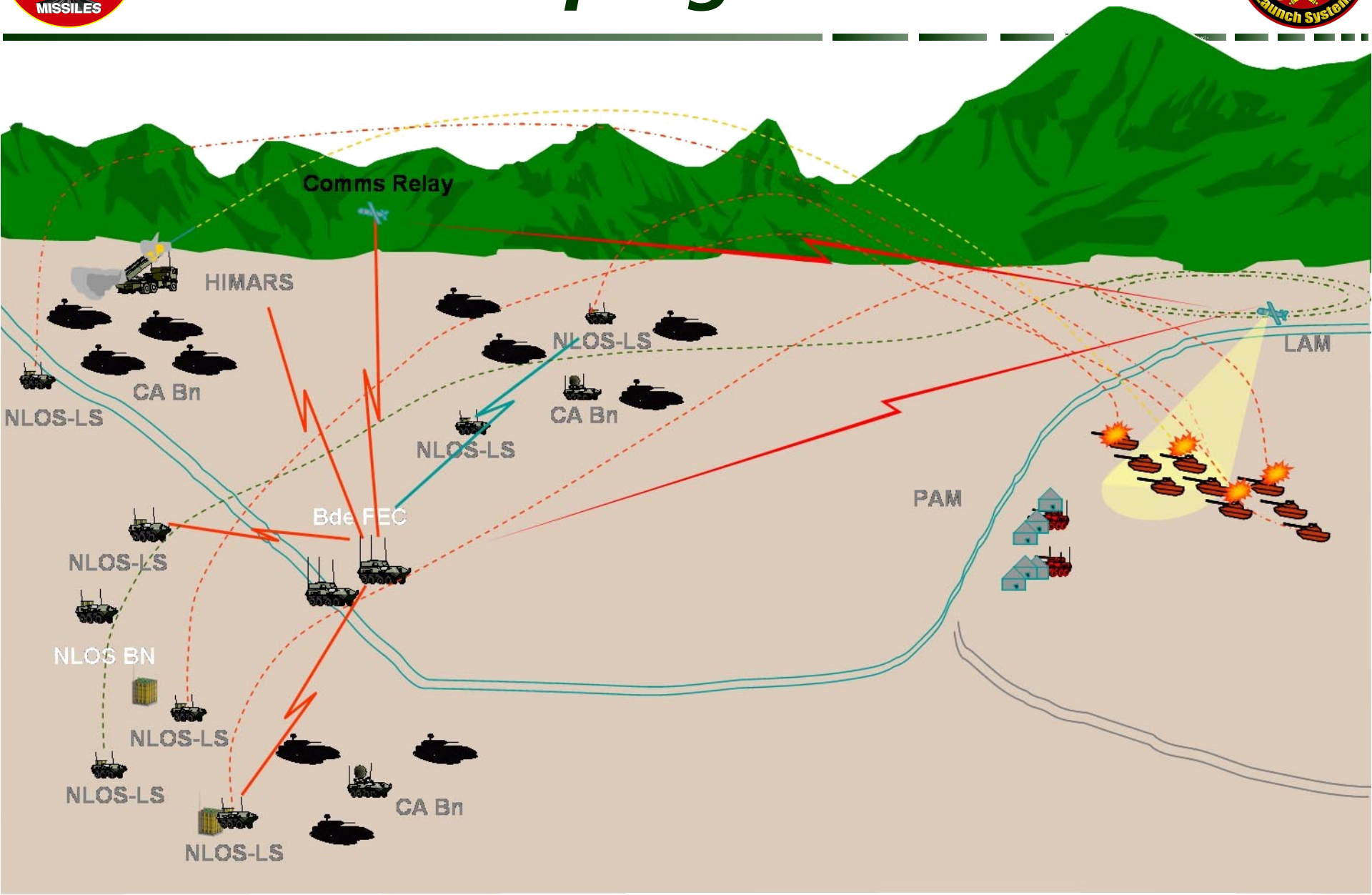
- CLU can be emplaced and left unattended in a hide / safe area
- Vertical launch from CLU is near impossible for counter battery detection
- Independent of transport vehicle
- Missiles (PAM, LAM) can be autonomous after launch
- 30 missiles (2 CLUs) and transport vehicle fit on C-130 for rapid response capability
- C-130 roll-on/roll-off capability
- Collateral damage is minimized due to accurate terminal guidance

Operational Vignettes

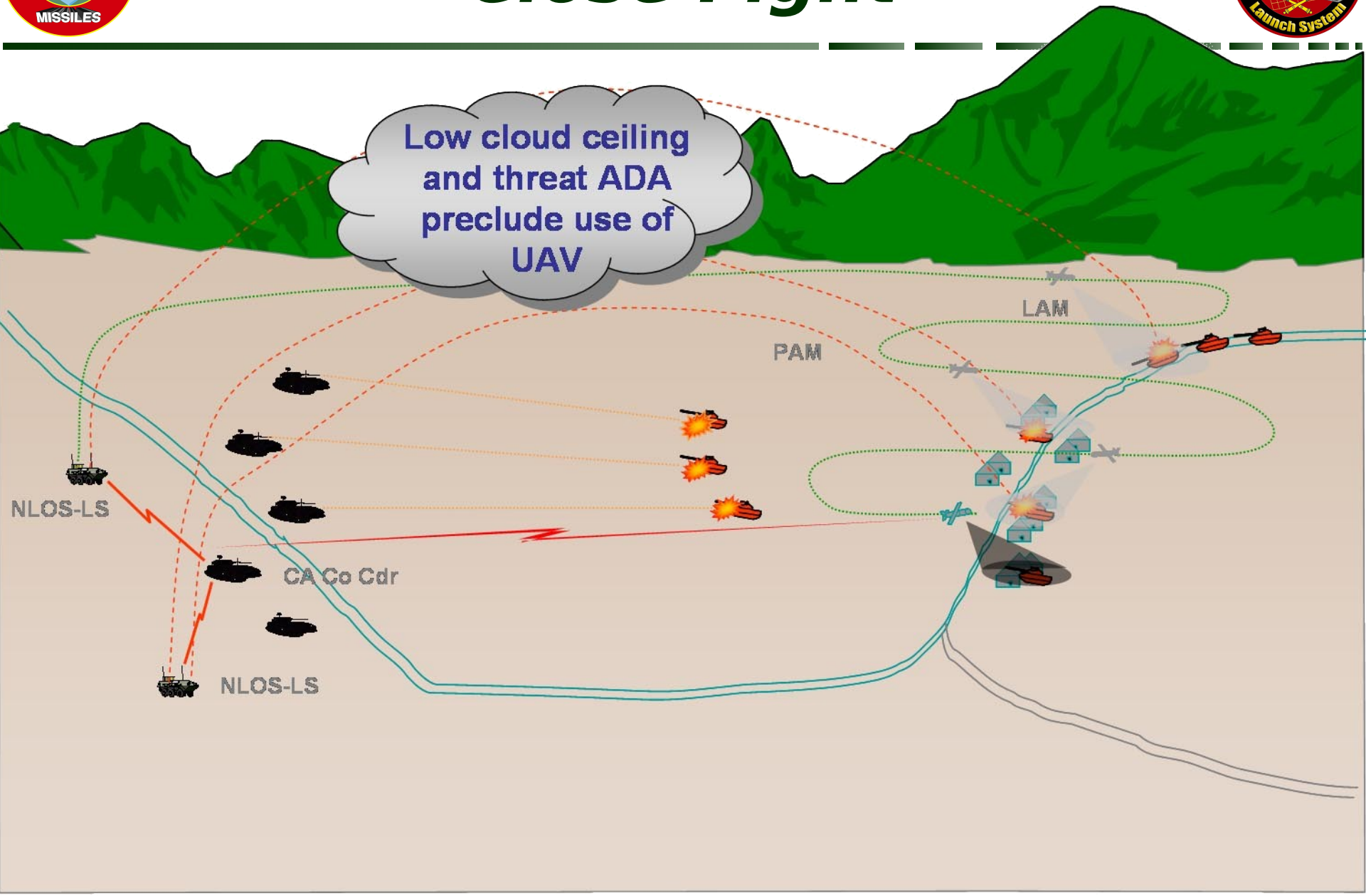
NLOS-LS Concept of Operation



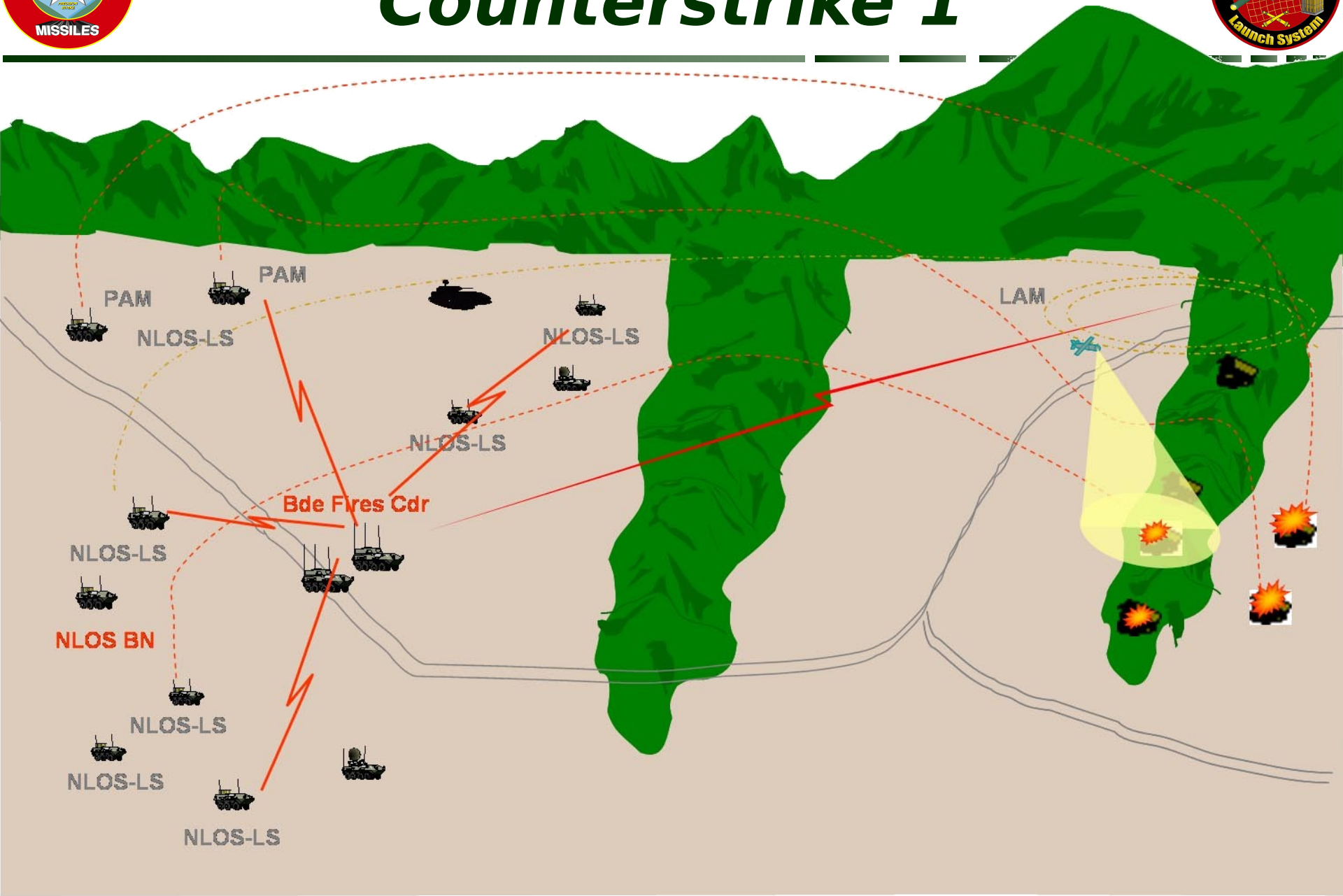
Shaping Fires



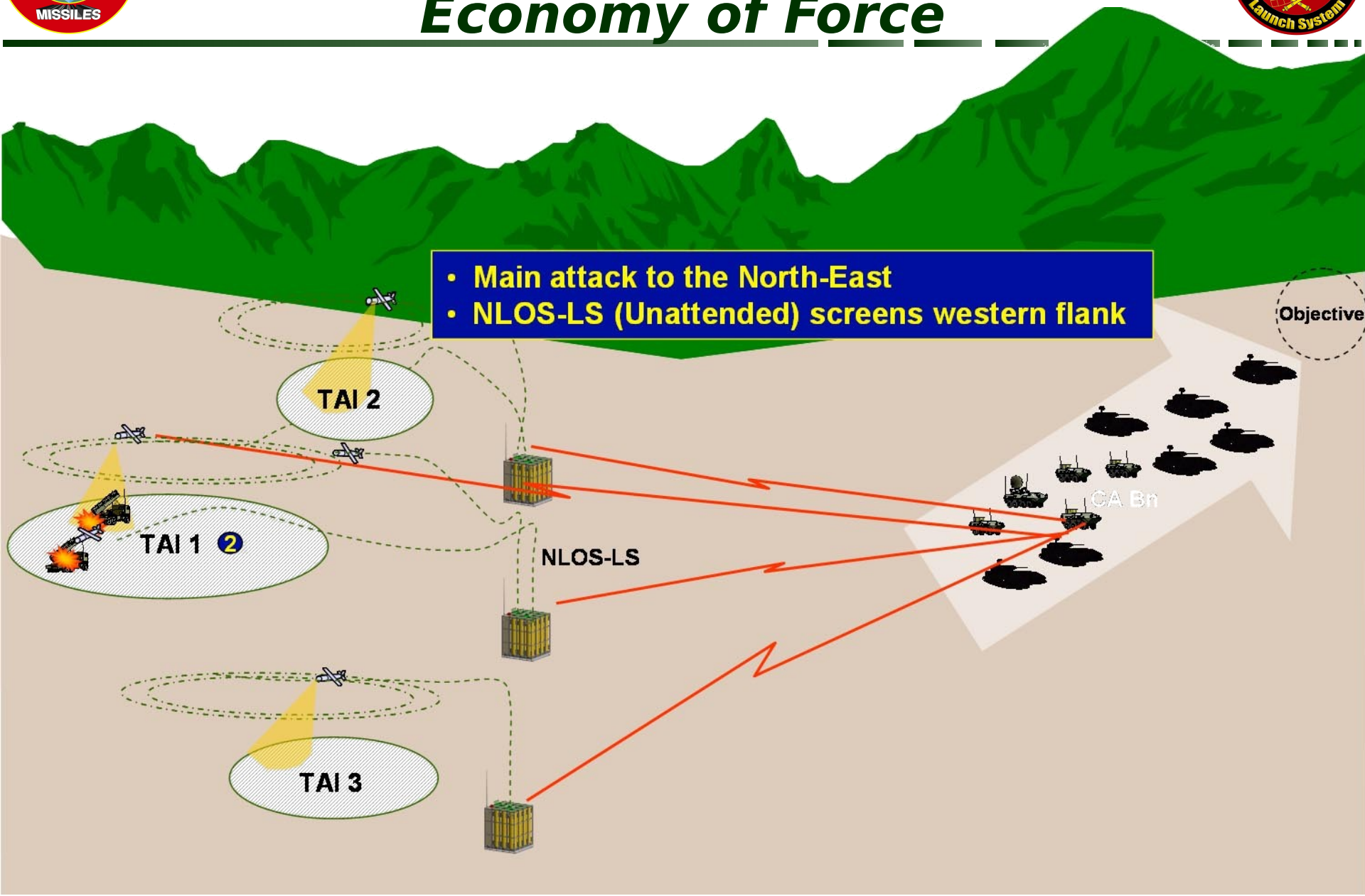
Close Fight


Low cloud ceiling and threat ADA preclude use of UAV
LAM
PAM
NLOS-LS
CA Co Cdr
NLOS-LS

Counterstrike 1



Unattended Operations
Economy of Force



Program Status

NLOS-LS Program Status

DARPA Program

Program closed out 5 March 2004 and fully transitioned to Army

Pre-SDD Risk Reduction

Army awarded contracts in March 2003 to both Lockheed-Martin and Raytheon to conduct trade studies and perform risk mitigation activities

SDD

Awarded to the NetFires LLC 19 March 2004

Contact Information

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Redstone Arsenal, Alabama 35898-8000 USA

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